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AUTHOR Beeson, Betty Spillers; Williams, R. Ann
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ABSTRACT

To investigate sex-stereotyping associated with computer use, a study was made of effects of gender and age on preschool children's involvement with computers during a school period allowing children to choose from among five alternative activities. A group of 16 boys and 16 girls was divided by age, with the resulting categories consisting of 17 children under and 15 children over 5 years of age. Data were collected by observing classroom activities in 30-minute periods, 3 days per week, for 5 consecutive weeks. Observers recorded each instance that a subject chose the computer activity. Results of a univariate analysis of variance for gender, age, and the interaction between these two factors revealed a statistically significant difference between males and females in the choice of the computer activity only for children under 5 years of age. It was concluded that the findings lend support for the practice of providing experiences with computers for preschool children. Implications of the findings for sex-stereotyping were briefly noted. (RH)

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THE EFFECTS OF GENDER AND AGE ON PRESCHOOL CHILDREN'S CHOICE OF THE COMPUTER AS A CHILD-SELECTED ACTIVITY

by

Betty Spillers Beeson, Ed.D.
Associate Professor,
Early Childhood Education Programs,
Elementary Education Department
Ball State University

and

R. Ann Williams, Ph.D.
Professor,
Early Childhood Education Programs,
Elementary Education Department
Ball State University

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BALL STATE UNIVERSITY

MUNCIE, INDIANA

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INTRODUCTION AND REVIEW OF THE LITERATURE

Papert (1980:181) cautions, "Educational innovators must be aware that in order to be successful they must be sensitive to what is happening in the surrounding culture and use dynamic cultural trends as a medium to carry their educational interventions." What is happening in the surrounding culture is ". . . the computer age . . . ." (Smith, 1981:83). Computers have already become indispensable to science, business and government and are becoming a part of the home life. Now computers must be utilized as tools for the education of children (Billings, 1980).

At what age should we introduce students to the computer? Hanna (1980:11) has recommended, "In a fast-growing computer society, literacy will eventually encompass computer literacy. We should give children early access to computers so they understand what the equipment can do--and perhaps more important what computers cannot do." But what does early mean?

Brace (1982:52) has suggested, "There aren't really enough studies around to say definitely that CAI (Computer Assisted Instruction) might have an even greater effect on younger--elementary school--children, but one set of recently conducted studies suggests that under certain circumstances it would indeed." An even earlier starting age is advocated by Palamara (Long, 1982:312), "The preschool level provides an

excellent psychological conditioning period to introduce computers . . . I found three-, four-, and five-year-old children to be very inquisitive and open to new concepts. During the early years, they can quickly develop a perception and appreciation of computers."

Thus, to remain a model preschool program for pre-service teachers, a computer was added to the resources of the early childhood learning center. The preschool program focuses on play as the young child's natural way of learning. "Interaction with computers and computer programs can be a component in children's play and in a productive learning environment" (Sanders, 1981:1).

Previous research has shown that many of the play activities of preschool children are sex-stereotyped (see Table 1). Would the computer be perceived as a sex-stereotyped activity? "One group that merits special attention is female students. Female students inherit a handicap (for the most part culturally derived) in the form of anxiety about computers and related technology. Computers, commonly viewed as 'number crunchers' are characterized by some--along with mathematics--as a male domain" (Winkle, 1982:315).

Research on the computer as a sex-stereotyped activity is limited, as is all research on computers in education. Most research literature, rather than reporting findings, stresses the

TABLE 1

PREVIOUS STUDIES REPORTING SEX DIFFERENCES

IN PLAY ACTIVITIES OF YOUNG CHILDREN

Study	Sex	Findings
Williams & Beeson (1982)	Males	Blocks, wheeled vehicles, sand/ water
	Females	Art Projects
Rubin (1977)	Males	Blocks, wheeled vehicles
	Females	Art activities
Tizard, Philps & Plewis (1976)	Males	Tires, crates, wheeled vehicles
	Females	Climbing frame
Harper & Sanders (1975)	Males	Blocks
	Females	Arts and crafts
Coates, Lord & Jakabovics (1975)	Males	Blocks
	Females	Dolls, formal games
Cramer & Hogan (1975)	Males	Blocks, vehicles
	Females	Dolls, furniture
Clark, Wyon & Richards (1969)	Males	Blocks, wheeled vehicles
	Females	Dolls, art activities
Shure (1963)	Males	Blocks
	Females	Doll area, art
Vance & McCall (1934)	Males	Blocks
	Females	Housekeeping
Parten (1933)	Males	Blocks, trains, kiddie-kars
	Females	Art activities, house play

need for research and identifies areas of study (Spencer and Baskin, 1981; Kearsley et al., 1983).

Two studies have produced conflicting findings. In the Granite system, more boys than girls used the computer at all levels. Scheingold (1981:9) reported, "At the elementary level the male/female ratio was 1.6 to 1, while at the high school level this number had increased to 3.5 to 1." The second study (Swigger et al., 1983) found no significant difference between males and females three to five years old in the number of sessions at the computer or the amount of time on the computer.

The dearth of consistent findings on sex-stereotyping associated with computer use and the researchers' previous studies of other play activities led to the initiation of the following study.

PROCEDURES

The purpose of the study was to investigate the effects of gender and age on preschool children's choice of the computer as a child-selected activity.

The subjects of the study were thirty-two children enrolled in a preschool program in a midwestern university. There were sixteen males and sixteen females. The children were divided into two age groups: children under five which included children forty-five to fifty-nine months of age and children over five which

included children sixty to sixty-seven months of age. There were seventeen children under five years of age and fifteen children over five years of age (see Table 2).

TABLE 2

SUBJECTS BY GENDER AND AGE

	Under Five Years of Age (45-59 Months)	Over Five Years of Age (60-67 Months)	Total
Males	6	10	16
Females	11	5	16
Total	17	15	32

The research was conducted during child-select time. This is a specified time in the preschool program when children may select an activity of their choice. Each day the children have a choice of five activities. The activities available are those traditionally found in preschool programs such as blocks, sand and water, wheeled vehicles and art activities (Rubin, 1977). This school year the computer was added as another child-selected activity.

An observational instrument was developed by the researchers. Each time a subject chose the computer as a child-selected activity, it was recorded (see Appendix A). The data were collected for five consecutive weeks during the spring. The

preschool program was in session three days a week for a total of fifteen observational periods. Each observational period was comprised of thirty minutes for a total of four-hundred and fifty minutes. The data were collected by two graduate assistants. The data were analyzed using a univariate analysis of variance.

RESULTS

The results of the univariate analysis of variance for gender, age and their interaction are given in Table 3.

TABLE 3

UNIVARIATE F-RATIOS FOR GENDER, AGE, AND INTERACTION OF GENDER AND AGE

Source	DF	SS	MS	F	P
Gender	1	144.71	144.71	2.95	.10
Age	1	26.78	26.78	.55	.47
Gender X Age	1	252.04	252.04	5.14	.03
Error	28	1373.96	49.07		

The overall mean for males was 10.75 and for females 6.88. The null hypothesis of no difference between preschool males and females in the choice of the computer as a child-selected activity could not be rejected (p .10).

The overall mean for children under five years of age was 8.53 and for over five years of age 9.06. The null hypothesis of no difference between children under five years of age and over five years of age in the choice of the computer as a child-selected activity could not be rejected ($p > .47$).

The null hypothesis of no interaction effect of gender and age in the choice of the computer as a child-selected activity was rejected ($p < .03$). There was a statistically significant difference between males and females under five years of age in the choice of the computer as a child-selected activity ($F=7.84$; $p < .01$). As shown in Figure 1, the mean for males under five years of age was 15.50 and for females under five years of age 5.55. However, there was no statistically significant difference between males and females over five years of age ($F=.25$; $p > .62$). As shown in Figure 1, the mean for males over five years of age was 7.90 and for females over five years of age 9.80.

For ancillary information, the data were analyzed by distribution of subject's frequency of the computer as a child-selected activity (see Table 4). One child did not choose the computer as a child-selected activity and another child choose the computer twenty-seven times during the fifteen days.

DISCUSSION

Although many studies have reported sex differences in the activities of young children (Table 1), this study and the

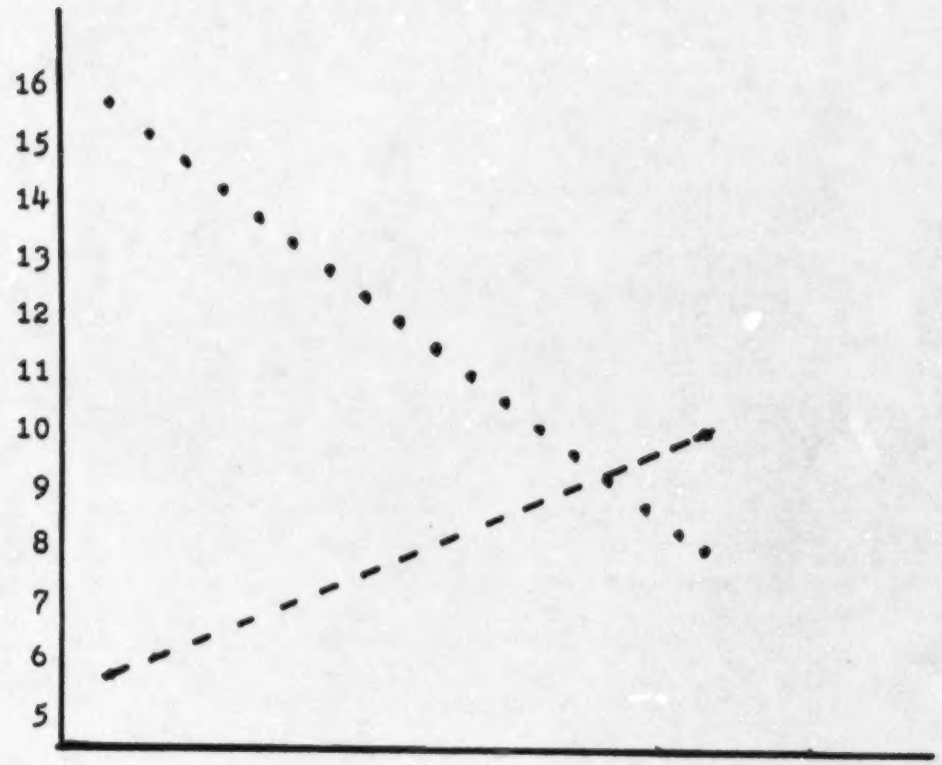

FIGURE 1

PLOT OF FOUR MALE-FEMALE
AND UNDER/OVER FIVE MEANS

TABLE 4

DISTRIBUTION OF SUBJECT'S FREQUENCY OF THE COMPUTER AS A CHILD-SELECTED ACTIVITY

Frequency of Computer Choosen As A Child-Selected Activity	Number of Subjects
25-27	1
22-24	3
19-21	1
16-18	1
13-15	3
10-12	2
7-9	6
4-6	6
1-3	8
0	1

one previously discussed (Swigger et al., 1983) indicate there is no difference between males and females in the use of the computer. While there may be no computer sex-stereotyping in preschool children, it has been observed in elementary school children (Scheingold, 1981). This suggests that children do learn through cultural experiences to view the computer ". . . as a male domain" (Winkle, 1983:315).

The lack of significant differences in the use of the computer between children under five years of age and those over

five years of age, in this study, lends support to the practice of introducing preschool children to the computer as advocated by Palamara (Long, 1982).

However, after drawing the above conclusion about the main effects of gender and age on the choice of the computer as a child-selected activity, the effect of gender and age interaction is difficult to interpret. The finding that children under five years of age displayed computer sex-stereotyping while those over five years of age did not is contrary to what would have been expected. There is a need for further research to clarify the effect of gender and age on the choice of the computer as a child-selected activity.

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OBSERVATION SHEET

Child's Name	Date														
	4/11	4/12	4/13	4/18	4/19	4/20	4/25	4/26	4/27	5/2	5/3	5/4	5/9	5/10	5/11

Observer _____

APPENDIX A

OBSERVATION SHEET

BALL STATE UNIVERSITY MUNCIE, INDIANA 47306-1099

TEACHERS COLLEGE
Department of Elementary Education

APPENDIX B

April 5, 1983

LETTER OF PERMISSION

Dear Parents:

We will be conducting a study to determine what children choose to do during child-selected activities. Our study will begin on April 11th and continue until May 11th.

While the children are participating in the regular child-selected activities, observers will keep a checklist on the activities chosen.

All information about an individual child's selection of activities will be kept confidential. Also, you may withdraw your child from this study at any time and without prejudice.

If your child may be included, please sign below and return it to us by Monday, April 11, 1983.

Thank you.

Sincerely,

Betty Beeson

Dr. Betty Beeson

Ann Williams

Dr. Ann Williams

I give permission for my child's _____
(name of child)
participation in Dr. Beeson's and Dr. Williams' study.

Parent Signature _____

Date _____

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